Winter Break 2014/2015 Pre AP Optional Home work

Dimensional analysis review and intro to Mole Calculations

Show ***All*** set up as we have done in class and use your green sheet! If you can do all of these as instructed, Semester II will be much easier ☺

1. 1.42 g/cm^2 to mg/mm^2
14.2mg/mm^2

2. 7.68 cal/sec to Kcal/min
0.461 Kcal/min

3. What is the volume, in milliliters, of a sample of helium that has a mass of $1.73x10^{-3}$g, given that the density is 0.17847 g/L?
9.69mL

4. What is the volume, in decimeters, of a sample of helium that has a mass of $1.63x10^{-2}$g, given that the density is 0.17847 g/L?
9.13E^{-2}dm^3

5. What is the mass, in grams, of a sample of helium that has a volume of $2.3x10^2mL$, given that the density is 0.17847 g/L?
4.1E^{-2}g

6. Calculate the volume of a sample of aluminum that has a mass of 3.057kg. The density of aluminum is 2.70g/cm³.
1138 cm³

7. Winnipeg is refilling the pool. How many gallons of water will it take if the pool is 50m by 25m by 1.5m? (1 gallon = 3.786 L)
5 x 10^5 gallons

8. The largest single rough diamond ever found, the Cullinan diamond, weighed 3106 carats; it was used to cut the world's largest diamond gem, the Star of Africa that weighed 530.2 carats. How much does each diamond weight in milligrams? in pounds? How many grams of diamond was cut away to make the Star of Africa from the Cullinan diamond? (1 carat – 0.2 gram)
621,200 mg; 1.368 lb; Star: 106040 mg; 0.2336 lb

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Intro to Mole calculations
Show All Work and Set Ups as demonstrated in examples

To find Formula Weigh or Molar Mass: Add the weight of each atom in a compound up to get the total mass. Atomic weight is found on periodic table (round to whole numbers for now)

Ex. 1

H_2O; 2 hydrogen at 1g/mol and 1 oxygen at 16g/mol so 2(1g/mol) + 1(16g/mol) =18g/mol H_2O

Ex. 2

$Al_2(SO_4)_3$; 2Aluminums at 27g/mol 3 sulfurs at 32g/mol and 12 oxygen's at 16g/mol so

$$2\left(\frac{27g}{mol}\right) + 3\left(\frac{32g}{mol}\right) + 12\left(\frac{16g}{mol}\right) = \frac{342g}{mol}\,Al_2(SO_4)_3$$

What are the molecular weights of the following compounds?

1) NaOH 40g/mol
2) H_3PO_4 98g/mol
3) H_2S
4) Mn_2Se_7

Solve the following:
How many moles are in 15 grams of lithium?

Ex: $\frac{15gLi}{1} \times \frac{1molLi}{7gLi} = 2.14mol\ Li$

5. **How many grams** are in 2.4 moles of sulfur?
76.8g S

6. **How many moles** are in 22 grams of argon?
0.55mol Ar

7. **How many grams** are in 88.1 moles of magnesium?
2114.4g Mg

8. **How many moles** are in 2.3 grams of phosphorus?
0.074mol P

9**. How many grams** are in 11.9 moles of oxygen?
380.8gO_2

10. **How many moles** are in 98.3 grams of aluminum hydroxide, $Al(OH)_3$?
1.26mol $Al(OH)_3$